Summary of Comments on the Proposed 2006 ENERGY STAR New Homes Program July 27, 2005

I. Overview

In response to significant changes in codes and standards in the field of residential energy efficient construction EPA proposed a new set of guidelines for ENERGY STAR for Homes in February 2005. EPA solicited comments on the proposal from interested parties from March – April 30, 2005.

EPA received 42 formal comments, representing the views of approximately 105 organizations (some comments received represented multiple organizations, but the individual organizations were not always identified). These included 6 builders and builder trade associations, 29 HERS Providers and certified raters, 31 utilities and state energy offices, 3 regional and national energy efficiency organizations, and 37 other stakeholders.

This document provides a summary of the general themes and common concerns of comments received, as well as EPA's response in each area. Although all specific technical comments are not covered in this document, EPA has reviewed these comments and incorporated the feedback in the revised specification, where appropriate. All of the comments submitted to EPA can be viewed on the ENERGY STAR Web site (at www.energystar.gov/homes/comments)

Comments submitted to EPA fell into the following general categories:

- Verification Methods
  - Performance-Based Verification
  - Prescriptive-Based Verification
- Implementation Timeline
- Heating and Cooling
  - Equipment
  - Sizing
- Duct Systems
- Lighting and Appliances
- Windows
- Water Heaters
- Thermal Bypass Checklist

Based on the comments received, EPA has developed a revised proposal. This revised proposal is posted at www.energystar.gov/homes. EPA is requesting comments on the revised proposal through August 19. After the comment period, EPA will review feedback received and make needed modifications to the proposal, with a goal of releasing the final new ENERGY STAR qualified homes guideline in September, 2005.

II. Summary of Comments and EPA Response

Verification Methods

EPA received 13 distinct responses on verification methods. These responses included comments from 4 builders and builder trade associations, 23 HERS Providers and raters, 22 utilities and state energy offices, 3 regional and national energy efficiency organizations, and 20 other stakeholders.

The most common concern of commenters was related to EPA's proposal to use a prescriptive package to define the ENERGY STAR qualified home guideline, rather than a single national HERS score or regional HERS scores. However, a number of commenters agreed that maintaining both prescriptive and performance paths was desirable.

Performance-Based Verification

Commenters noted the following benefits for maintaining the HERS score threshold as the primary metric for qualification of homes as ENERGY STAR:

- The HERS score is the nationally accepted method for measuring the energy efficiency of homes and is used across a variety of residential energy efficiency programs;
- Many utilities and other program implementers base their incentive levels on tiered HERS scores and maintaining HERS scores as a baseline enables this program approach; and
- Use of the HERS score allows program implementers to calculate savings.

Commenters were also concerned with the performance-based path of EPA's proposal, with several noting that the performance option, as EPA proposed it, could lead to gaming, confusion, and increased costs. There were also concerns that ENERGY STAR was creating a new reference home that would compete with other programs.

Prescriptive-Based Verification

Commenters cited a number of benefits of continuing to offer a prescriptive path, including simplification of the approach; ease of readability; and a uniform understanding of what ENERGY STAR represents.

There were several comments addressing specific aspects of the proposed prescriptive path; with some noting that particular requirements were too stringent, others that particular requirements were too weak. Often these disparate opinions were related to the same requirements. Additional comments received from industry also indicated a strong desire to ensure that the prescriptive path to ENERGY STAR qualification was at least rigorous as the performance path, across all climate zones.

EPA Response: Based on comments received on the issue of verification, EPA is proposing the following changes in the revised proposal:

- ***In response to concerns raised about EPA keying ENERGY STAR to a prescriptive package rather than a HERS score, EPA is proposing that the performance path for ENERGY STAR qualified homes will be based on the HERS scoring methodology. Specifically, the proposed minimum scores for ENERGY STAR qualified homes are HERS 83 (Expanded Score) in climate zones 1 – 5 and HERS 84 (Expanded Score) in climate zones 6 – 8.***

  Due to this change, EPA needed to address several additional concerns not in the original proposal:

  1. To ensure that the revised performance path proposal maintained EPA's intent to increase the presence of ENERGY STAR qualified components in homes that earn the label, EPA is proposing to add a requirement for a limited number of ENERGY STAR components in the performance path. Specifically, the proposed performance path requires builders to include at least <u>one</u> of the following:

  - ***ENERGY STAR qualified heating <u>or</u> cooling equipment (climate-zone appropriate);***
  - ***ENERGY STAR qualified windows; or***
  - ***A combination of five or more ENERGY STAR qualified light fixtures, fans (ceiling or bathroom), and/or appliances***

  2. Recognizing that the Expanded HERS score provides significant credit for energy-efficient light bulbs, EPA wants to ensure that important market transformation gains in improved envelope and equipment are not lost to tradeoffs with efficient light bulbs. EPA is also concerned that the energy savings of efficient light bulbs may have a shorter lifetime and unclear persistence compared to other envelope and equipment measures.

  Therefore, within the performance path, EPA is proposing to limit the number of energy efficient bulbs that can be counted towards the required Expanded HERS score (for the purpose of ENERGY STAR qualification) to no more than five. However, builders will be encouraged to install as many energy efficient bulbs as they desire.

- ***In response to commenters' interest in having a prescriptive path to ENERGY STAR qualification, EPA is maintaining the prescriptive path based on the original proposed specification, with technical modifications on specific requirements based on comments received. Further, the prescriptive package's window requirement has been slightly modified in some southern climate zones to ensure that it is always at least as rigorous as the required HERS score.***

Implementation Timeline

EPA received ten distinct responses on the implementation timeline. These responses included comments from 2 builders and builder trade associations, 26 HERS Providers and certified raters, 20 utilities and state energy offices, 3 regional and national energy efficiency organizations, and 37 other stakeholders.

In general, commenters felt that the EPA's proposal did not give builders and program implementers sufficient time to move to the new guidelines, due to both financial and logistical concerns. Commenters were particularly concerned about logistic considerations regarding product availability and the cost of air conditioning to meet the ENERGY STAR requirement, as well as having a sufficient grandfathering period for qualifying homes in a builder's current construction cycle.

EPA Response: Based on comments received regarding implementation timeline issues, EPA's revised proposal extends the phase-in period from the original date of January 2006 to July 2006. EPA believes that providing this additional six months will allow for builders, program implementers, and manufacturers to successfully move to the new guidelines.

If they choose to do so, partners may begin using the new guidelines as soon as they are officially released by EPA (estimated in September 2005), though this is not a requirement. However, all home labeled as ENERGY STAR on or after July 1, 2006 must be qualified using the new guidelines.

Heating and Cooling

Equipment

EPA received 16 distinct comments on the proposed air conditioning equipment requirements. These responses include comments from 3 builders and builder trade associations, 4 Providers and certified raters, 23 utilities and state energy offices, 1 regional energy efficiency organization, and 5 from other commenters. Comments included:

- Anticipated short-term availability issues for 14 SEER A/C units;
- Builder concerns about the added cost of 14 SEER A/C units; and
- The ability of 14 SEER A/C units to effectively control humidity in hot and humid climates.

Right-Sizing

EPA also received eight distinct responses on EPA's proposed sizing requirements. These responses include comments from 5 HERS Providers and certified raters, 27 utilities and state energy offices, 2 regional and national energy efficiency organizations, and 10 from other stakeholders. Commenters specifically recommended that EPA needed to provide more details on the definition of and acceptable tools for sizing, limits on specific sizing inputs, and how proper sizing would be verified.

EPA Response: EPA's revised proposal addresses the equipment concerns expressed by commenters by allowing for the use of non-ENERGY STAR air conditioning units when homes are qualified using the performance path (provided they meet national and state codes and standards). This will also allow builders to weather any short-term availability and cost issues associated with 14 SEER equipment and also gives Home Energy Raters the discretion to recommend the use of lower SEER equipment when there are concerns about humidity control.

EPA is proposing to maintain the ENERGY STAR equipment requirement (i.e., 14 SEER) in the prescriptive path. EPA believes that it is important to show air conditioning manufacturers strong support for their moving to this higher level of efficiency and that product will be readily available in a timely manner.

To address concerns raised about right-sizing requirements, EPA's revised proposal specifies that any RESNET-approved proper sizing protocols, which are not limited to ACCA Manual J, can be used for verifying proper sizing of HVAC equipment. More information on these protocols can be found in chapter 3,B.6.b.(7) of the HERS Standard.

Duct Systems

EPA received four distinct responses on EPA's requirements for duct systems. These responses included comments from 3 HERS Providers and one regional energy efficiency organization. Commenters were generally supportive of EPA setting maximum duct leakage and insulation requirements; however, there were a number of concerns, including:

- The 4 cfm per 100 sq. ft. leakage is too stringent and the infrastructure needed to support this level of performance is not pervasive enough across the country;
- Duct system leakage requirements should be expressed as total leakage in addition to leakage to the outside;
- Additional concerns expressed by industry regarding EPA's use of the 2004 IECC to specify duct insulation levels in the prescriptive path, as they are currently being challenged; and
- R-8 duct insulation may be challenging due to product availability, cost, and installation challenges.

EPA Response:

EPA believes that a performance level of 4 cfm per 100 sq. ft. is an achievable target for ENERGY STAR builder partners. As a result, this requirement is maintained in the revised prescriptive proposal. However, builders not able to meet this target can qualify their homes using the performance path, which allows for as much as 6 cfm per 100 sq. ft. of leakage to outdoors.

EPA agrees that testing total duct leakage, in addition to leakage to the outside, is critical to properly assessing the energy impact of duct systems. As a result, EPA's revised proposal includes a requirement to verify total duct leakage at less than 9 cfm per 100 sq. ft., as specified in the IECC. EPA is also proposing to waive all duct leakage testing

requirements when ducts are located in conditioned space AND the envelope leakage has been tested to be at or below 3 ACH50.

In response to concerns about the 2004 IECC, EPA has revised the duct insulation requirements in the prescriptive path to specify the 2003 IECC. EPA recognizes that referencing the 2003 IECC still stipulates R-8 ducts in many climate zones. Nevertheless, EPA believes that it is important that the prescriptive package reflect the latest minimum code requirements for duct insulation. However, using the performance-based approach to qualification will allow builders the flexibility to choose lower duct insulation levels, provided they meet local code requirements.

ENERGY STAR Qualified Windows

EPA received eight distinct comments representing 23 state and utility companies, 4 HERS Providers and certified raters, 2 regional and national energy efficiency organizations, 9 other stakeholders related to the requirement for inclusion of ENERGY STAR qualified windows. These include:

- The window requirements for homes exceeding 21% window to floor area are confusing and could be very costly for builders;
- Direction is needed to address windows which are not labeled, e.g., door sidelight windows, basement, transom, etc.; and
- The ENERGY STAR windows program has been such a success that labeled windows are now code-minimum in many parts of the country. As a result, the window specification should be more stringent for ENERGY STAR homes.

EPA Response: EPA believes that the vast majority of homes that are qualified as ENERGY STAR have window to floor areas less than or equal to 21%. Thus, EPA has provided a simple solution for most builders who choose the prescriptive path. EPA recognizes the increased complexity for homes exceeding 21%, however EPA believes that the proposed calculation method is the simplest option that appropriately addresses the energy impacts of increased glazing in these homes. As a result, in the prescriptive path, EPA will continue to require homes exceeding 21% window to floor area to comply with the dynamic approach for determining window U-value and SHGC specifications.

To address concerns about non-labeled windows, an additional note has been added to the prescriptive path which specifies that up to 0.5% WFA may be used for windows with decorative glass (i.e., doesn't meet ENERGY STAR requirements). In addition, a maximum of 1.0% WFA may be used for skylights. All decorative glass and skylight window area counts towards the maximum window area.

With regard to concerns that the ENERGY STAR window specification is not rigorous enough in the prescriptive package, EPA believes that the ENERGY STAR label is the best option for specifying a high-quality window appropriate across a wide range of climate zones. Therefore, EPA will continue to require - at a minimum - that windows qualify as ENERGY STAR in the prescriptive path. Note that in some southern climates, the prescriptive window requirements have been specified at above-ENERGY STAR performance to assure that the prescriptive path meets or exceed the performance path

score. However, when using the performance path, builders can select any window of their choice - so long as their homes meet the required HERS score.

Lighting and Appliances

EPA received 14 distinct responses on lighting and appliance requirements. These responses included comments from 5 builders and builder trade associations, 29 HERS Providers and certified raters, 34 utilities and state energy offices, and 29 from other stakeholders. In general, commenters had questions about how the requirement of at least five ENERGY STAR qualified fixtures, fans, or appliances would be applied when the performance approach was used to qualify homes. Some commenters also expressed concern that the inclusion of lighting and appliances in the performance approach could potentially lessen the efficiency requirements of the envelope and other equipment, as well as make it difficult for the program to be used as an alternative to code compliance.

Additional specific comments on the lighting requirement included:

- More robust lighting requirements should be considered (such as California's Title 24);
- Qualified lighting fixtures are not pervasive enough in all decorative styles and price points to accommodate EPA's proposed requirement; and
- Screw-based CFLs should be allowed as well due to studies indicating their equal persistence to pin-based fixtures in the home.

Regarding the appliance requirement, some commenters also felt that appliances should not be included since they are non-construction items (not part of the permanent structure and sometimes chosen by homebuyers). Lastly, some commenters felt that EPA should separate the appliance requirement from lighting because of concerns that appliances would not be used by builders due to greater cost differentials for ENERGY STAR appliances than for lighting fixtures.

EPA Response: EPA believes that requiring builders to include some level of ENERGY STAR qualified products in homes that earn the label is an important first step towards raising their awareness to the availability of such products and to increase consumer awareness of the brand. Additional lighting requirements, such as inclusion of the ENERGY STAR Advanced Lighting Package, will be considered for implementation in 2009.

With regards to concerns about pervasiveness of ENERGY STAR qualified lighting fixtures, EPA believes that their availability is more than sufficient to allow builders to meet the prescriptive requirements, particularly in light of the option to also use qualified fans and/or appliances. In addition, lighting fixture manufacturers are continually adding new designs and models to their ENERGY STAR qualified offerings.

In response to commenters' recommendation that EPA allow CFLs, as well as fixtures, to meet the prescriptive requirement for lighting, EPA reviewed two studies (Vermont and Pacific Northwest) that are often cited when discussing the "persistence" of qualified light fixtures versus qualified light bulbs. The scope and results of these two studies are very different, and thus EPA does not feel definitive conclusions can be made at this time. While qualified light bulbs offer significant value in making existing light fixtures

more energy efficient, EPA feels that dedicated fixtures offers greater assurance of persistent energy savings with non-regressive technology. Therefore, EPA is maintaining that only ENERGY STAR qualified light fixtures may be used to comply with the lighting and appliance section of the new prescriptive package. However, builders are able to receive credit for installing up to 5 energy efficient light bulbs with the Expanded HERS scoring method when performance compliance is used.

With regard to commenters' recommendation on ENERGY STAR qualified appliances, EPA believes that increasing the requirements for builders to install qualified appliances beyond the current proposed requirement could undermine the viability of the prescriptive package, particularly for production builders. Moreover, the intent of the lighting and appliance requirement is to establish an initial awareness and inclusion of qualified products in labeled homes. EPA will consider modifications to the lighting and appliance requirements in future revisions of the program.

Water Heaters

EPA received eight distinct responses on the water heater requirements. These responses represent 8 state energy offices and utility companies, 4 builders and builder trade associations, and one other stakeholder. Specific concerns about the requirements for water heaters included:

- Direct-vent/sealed combustion or power-vented water heaters should be required to provide greater assurance of combustion safety; and
- Concern that the required 0.60 EF is not available on certain gas water heater tank sizes – specifically 75 gallons, which is fairly common in some markets.

EPA Response: EPA has chosen to address non-spillage water heaters though the new ENERGY STAR Indoor Air Package label that compliments ENERGY STAR qualified homes. In addition, EPA supports the efforts of numerous regional programs that have elected to require power/direct-vented equipment based on their preferred program design. Such modifications that increase the rigor of the national ENERGY STAR specifications continue to be permissible under the new guidelines. EPA will also consider a requirement for including power/direct-vented water heaters in future program enhancements.

With regard to concerns about availability of equipment meeting the specified energy factor requirements, EPA's revised proposal varies the hot water heater requirement, based on tank size. These new proposed levels will require hot water heaters to be slightly better than the minimum NAECA standard efficiency. EPA has confirmed that these efficiency levels are readily available.

Thermal Bypass Checklist

EPA received a total of 15 distinct responses on the Thermal Bypass Checklist. These responses include comments from 35 utilities and state energy offices, 24 HERS Providers and raters, and 17 other stakeholders. Commenters had strong feelings about the Thermal Bypass Checklist. A majority of commenters were generally fully supportive, but several were firmly against it. While some commenters felt the checklist was a good start at including more building science concepts in to residential construction, others felt that it would add little value and increase cost. Regardless of their position, many stakeholders had concerns about the clarity and associated costs of the checklist. In addition, several commenters provided specific suggestions and edits on the language in the checklist.

Questions on the clarity of the checklist included:

- Defining what constitutes a 'failure;'
- Determining if the entire checklist must pass all elements for a home to become ENERGY STAR qualified;
- Defining the consequences and possible corrective actions of a failure;
- Identifying who can be responsible for ensuring compliance with the checklist;
- Determining how the checklist requirements may be affected by local or state codes and/or other energy efficiency program requirements; and
- Clarifying how the checklist will affect sampling.

EPA Response: A majority of commenters indicated support for the Thermal Bypass Checklist and, as a result, EPA's revised proposal maintains the checklist as an additional requirement for both the prescriptive- and performance-based paths. The revised Thermal Bypass Checklist included below reflects EPA's responses to recommended technical changes, instructions, and implementation guidance provided by commenters. Specific links between major comments and notes on the checklist are provided below:

- ***Defining what constitutes a failure (See Checklist Note #1);***
- ***Determining if the entire checklist must pass all elements for a home to become ENERGY STAR qualified (See Checklist Note #1);***
- ***Defining the consequences and possible corrective actions of a failure (See Checklist Note #3);***
- ***Identifying who can be responsible for ensuring compliance with the checklist (See Checklist Note #2);***
- ***Determining how the checklist requirements may be affected by local or state codes and/or other energy efficiency program requirements (See Checklist Note #5); and***
- ***Clarifying how the checklist will affect sampling (See Checklist Note #4).***

Thermal Bypass Inspection Checklist
ENERGY STAR Qualified Homes

A Thermal Bypass Inspection Checklist must be completed for homes to earn the ENERGY STAR label. The checklist requires visual inspection of the most common areas of air leakage and improperly installed insulation, serving as an extra check that the air and thermal barriers are continuous and complete. For purposes of this checklist, an air barrier is defined as any solid material that blocks air flow between a conditioned space and unconditioned space, including necessary sealing to block air flow at edges and seams (e.g., caulk or tape).

Guidance on Completing the Thermal Bypass Inspection Checklist:

1. Accredited HERS Providers and certified home energy raters shall use their experience and discretion to verify that each checklist item is installed per the inspection guidelines (e.g., determining minor defects that are acceptable versus complete omission or installation problems undermining the intent of the checklist item that should be considered as a failure).

2. In the event an item in the checklist cannot be verified by the Provider or rater, the home cannot be qualified as ENERGY STAR, unless the builder assumes the responsibility for verifying, under the direction and oversight of the Provider or rater, that the item has met the requirements of the checklist. This responsibility will be formally acknowledged by the builder signing-off on the checklist. However, the Provider or rater has the discretion to restrict builders from performing this verification if they feel the builder does not have the experience to competently complete the checklist.

3. In the event that a Provider or rater finds an item not consistent with the inspection guidelines, the home shall not be qualified as ENERGY STAR and shall be corrected in a manner consistent with other elements of ENERGY STAR qualification (e.g., any measure or diagnostic required by performance or prescriptive compliance). If correction of the item is not possible, the home cannot earn the label.

4. The checklist may be completed for a batch of homes when the RESNET-approved sampling protocol is employed to qualify the homes as ENERGY STAR.

5. State/local/regional codes, as well as regional ENERGY STAR program requirements, supersede the items specified in the checklist.

6. Alternative methods of meeting checklist requirements may be used if the Provider or rater deems them to be equivalent or more stringent than the checklist inspection guidelines.

7. The Provider is required to keep a hard copy record of the completed and signed checklist. The signature of an employee of the builder is also required if the builder verified compliance with any item on the checklist.

8. Additional information on proper air sealing of thermal bypasses can be found on the Building America Web site (www.eere.energy.gov/buildings/building_america) and in the EEBA Builder's Guide (www.eeba.org). These references include air sealing/air barrier guidance and details on many of the items included in the checklist.

Thermal Bypass Inspection Checklist
ENERGY STAR Qualified Homes

House Address:_____City:_____ST:____

Thermal Bypass	Inspection Guidelines	Rater Verified	Builder Verified
1. Shower/Tub at Exterior Wall	Walls have been sheathed with an air barrier material	☐	☐
	Walls have been fully insulated	☐	☐
2. Insulated Floor above Garage	Air barrier is installed at any exposed edges of insulation	☐	☐
	Insulation is installed to maintain permanent contact with the underside of the sub-floor decking	☐	☐
3. Attic Knee Walls	Air barrier is installed on attic side of insulated wall and is continuous across floor joists at knee wall base or continuous along rafters at exterior wall plate	☐	☐
	Insulation is in complete alignment with interior wall finish and the attic side air barrier	☐	☐
4. Attic Hatch/Drop-down Stair	Attic hatch or cover is fully gasketed for an air-tight fit	☐	☐
	Hatch is covered with insulation that is attached and fits snugly in framed opening	☐	☐
5. Cantilevered Floor	Air barrier spans cantilever and any exposed edges of insulation	☐	☐
	Floor framing is completely filled with insulation or insulation is installed to maintain permanent contact with the sub-floor decking	☐	☐
6. Duct Shafts	Openings to unconditioned space are sealed with solid blocking and any remaining gaps are sealed with caulk or foam	☐	☐
7. Flue Shaft	Opening around flue is fully sealed with flashing and any remaining gaps are sealed with fire-rated caulk or sealant	☐	☐
	Combustion clearance between flue and combustible materials (e.g., OSB) are properly closed with UL approved metal collars	☐	☐
8. Piping Shaft/ Penetrations	Opening is fully sealed as required with flashing and any remaining gaps are sealed with caulk or foam	☐	☐
9. Dropped Ceiling/ Soffit	Air barrier is fully aligned with insulated framing and any gaps are fully sealed with caulk or foam or fire-rated sealant	☐	☐
10. Fireplace Wall	Air barrier is fully aligned with insulated framing in framed shaft behind fireplace and any gaps are fully sealed with caulk or foam	☐	☐
11. Staircase Framing at Exterior Wall/Attic	Air barrier is fully aligned with insulated framing and any gaps are fully sealed with caulk or foam	☐	☐
12. Recessed Lighting	Seal airtight IC-rated recessed light fixtures (that meet ASTM E283 requirements) to drywall with gasket, caulk or foam	☐	☐
13. Whole-house Fan Attic Penetration	An insulated cover is provided that is gasketed or sealed to the opening from either the attic side or ceiling side of the fan	☐	☐

Home Energy Rating Provider:_____Builder Company Name:_____

Home Energy Rater Company Name:_____Builder Employee Signature[1]:_____

Home Energy Rater Signature:_____Inspection Date:_____

Inspection Date:_____Re-Inspection Date:_____

[1] Signature acknowledges that the builder verified checklist items comply with inspection guidelines.